

AN/AAR-47 (V)2 Missile and Laser Warning System

The original AN/AAR-47, fielded in the late 1980s, provides passive warning against infrared guided missiles directed at its host aircraft. In addition to providing warning to the aircrew, it cues an onboard expendable dispenser to eject countermeasures flares to defeat infrared guided missiles. The system consists of four sensor units oriented about the aircraft to provide 360-degree azimuth protection; a processor that analyzes the signals received by the sensors declares an incoming threat, warns the aircrew, and initiates dispensing of flares; and a control/indicator unit that provides warning indications to the aircrew and allows control of the system (in some aircraft installations control and indication are integrated into the APR-39 radar warning receiver controls and displays).

The AAR-47(V)2 upgrade is intended to provide improved sensors that eliminate sensor blackening, a known failure mode; increase temperature tolerance and provides a more uniform sensitivity; and provides a new filter to improve false alarm control. Additionally, the new sensor has a laser detector that allows the AAR-47(V)2 to provide the functionality of the AVR-2/2A laser warning systems. This added functionality will allow the Navy to retire the AVR2/2A at a considerable cost saving and provide laser warning for aircraft that did not have the AVR2/2A installed. New software, version 22.21, provides increased probability of missile detection and reduced false alarm rate, provides for laser threat correlation and classification, and revises the interface with the APR-39 Radar Warning Receiver to provide laser warning information. A new control/indicator that incorporates the laser warning capability is also provided for aircraft without an APR-39.

There are roughly 2,500 AAR-47 systems worldwide. Approximately 2,000 belong to the Department of Defense; of those, around 1,200 belong to the Navy. The Navy has 254 AVR-2s and 42 AVR-2A systems. Navy aircraft that currently have, or are planned to have, AAR-47 capability are: H-1 variants, various H-3 Type, Model, Series (TMS), CH-46E, H-53 TMS, H-60 TMS, V-22, P-3C, and C-130 TMS. Navy aircraft equipped with AVR-2s are the UH-1N, AH-1W, VH-3, and VH-60. HH-60H aircraft are equipped with the AVR-2A. The Navy's intent is to eventually replace all AAR-47s and AVR-2/2As with the AAR-47(V)2.

TEST & EVALUATION ACTIVITY

Developmental Test/Operational Test of the missile warning and laser warning capabilities was conducted during FY01. Test events included live missile shots at the Aerial Cable Car Facility (ACF) at White Sands Missile Range, laser warning flight tests at both White Sands and the Naval Air Warfare Center at Patuxent River, Maryland, and false alarm testing at several locations. The ACF tests used a UH-1 hulk as the test platform and all flight tests were conducted on a UH-1N. The upgraded missile warning functions with software version 22.21 were tested against a baseline system with software version 20.0. The laser warning functions were compared against the performance of the current AVR-2A. The baseline AAR-47 and/or the AVR-2A were installed in the test vehicle, along with the AAR-47(V)2 as appropriate for the test being conducted. As a result of questions concerning the results of tests against one class of laser threat during FY01 testing, tests were repeated in FY02 using a higher fidelity simulator of the threat in question than had been available for the FY01 tests.



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NAVY PROGRAMS

TEST & EVALUATION ASSESSMENT

During Developmental Test/Operational Test, the AAR-47(V)2 demonstrated satisfactory performance in all aspects of the missile warning function. Using the version 22.21 software, it provided timely detection of all 12 missiles of various types fired at it during the live fire tests. The false alarm rate was considerably reduced compared to the version 20.0 baseline software. During the FY01 tests the laser warning function performed satisfactorily against one class of threat but unsatisfactorily against another. The missile and laser warning false alarm rates were acceptably low.

Based on the results of the Developmental Test/Operational Test, the Navy decided to proceed with a Low-Rate Initial Production of 207 systems while continuing to try to resolve the observed deficient performance against the one class of laser threat.

Results of the FY02 repeat of the test against the class of laser threat that produced deficient results in FY01 confirmed that the AAR-47(V)2 performance against that class of threat is not equivalent to the AVR-2A. Based on these results, the Navy appropriately decided to modify acquisition and fielding plans, and proceed to dedicated Operational Test of the AAR-47(V)2 missile warning function only. These tests were started in October 2002 and are ongoing. Many of the suitability measures of effectiveness await resolution in the remaining dedicated Operational Test phase of testing, but current assessments for logistical considerations are very promising. The system has demonstrated good reliability to date and only one built-in test false alarm was noted in 81.5 hours of operation.